

inclination to refer locally restricted events to large general causes.

Mr. Hyde Clarke, who was in the chair, drew attention to the fact that it was by a paper of his thirty years ago that public attention was first directed in what he might term a scientific form to this periodicity. Prof. Stanley Jevons, who was the great advocate for the application of the sun-spot theory to commercial crises, had reproduced the statements he made thirty years ago, and thus fresh attention had been called to them. For his part, he was no advocate for what was called the sun-spot theory, for he believed the sun-spots had no direct bearing on the periodicity of commercial crises, or upon the height of the Nile; but as what Dr. Mann had said might appear to throw discredit on the periodicity of crises, he would briefly revert to the facts to which he had formerly called attention. He had then gone through the corn harvests, as shown by the prices in England for the last 400 years, for which data could be obtained, and his observations, which had since been repeated by Prof. Jevons, gave a series of facts over six centuries, showing that there was a periodicity in the crops, and consequently in the commercial phenomena dependent on them, of somewhere about ten years. Prof. Jevons had fastened on to that one fact, but had not referred to other observations he had made, which gave the clue to the question Mr. Cobb had raised, whether it was possible to predict these periods. There was certainly, in a long period, a periodicity of about ten years, and if you laid out a diagram you would find this plainly shown, but yet in some places the lines of dearth or plenty would seem to come in the wrong place, and no one has yet been able to hit on the true law. He had stated that, as far as he could discover from the facts before him, there were, besides the periods of ten years, other periods of about twenty-six years, and likewise a period of about 104 years, and the opinion he formed was that these longer periods interfered with the shorter ones, and prevented any absolute calculation as to the future. At the same time the observation of these phenomena was not by any means an idle matter; there was this practical lesson to be drawn from it, that in periods of prosperity we must look forward to a period of adversity and prepare for it. Therefore the observation of Governments, and of the commercial community and financial institutions should be directed to these great phenomena of nature, which, after all, did govern the individual operations of man.

And this is all we contend for. That there is a connection between certain well-known cosmical phenomena, centring in the sun-spot period, is admitted by all whose researches give them a right to pronounce an opinion on the subject. What is the exact nature of this connection has yet to be discovered, though that we are on the road to it every careful reader of *NATURE* must admit. The immense social and economical results depending on the definite ascertainment of this connection make it the bounden duty and the interest of civilised Governments to do all in their power to further research in this direction, and we have no doubt that when the full truth is known it will be found that even the apparently capricious Nile is obedient to influences that may be regarded as ultimately cosmical.

NOTES

WE are pleased to see a suggestion in the *Midland Counties Herald* that in considering the arrangements for the restoration of the Reference Library, recently almost destroyed by fire, the authorities will not miss the opportunity they now have of supplying an omission in the public institutions of Birmingham, by organising a Natural History Museum, of equal value with the Reference Library which they are doing their best to restore. We heartily endorse this suggestion, and indeed it seems strange

that so energetic and intelligent a town as Birmingham, with one of our most enterprising Natural History Societies in its midst, should not have had such an institution long ago. We are sure the matter only needs to be properly brought before the authorities and the citizens to have the blank speedily and properly filled up.

MR. JOHN SADLER, so long assistant to Prof. Balfour, has been appointed to succeed the late Mr. McNab as curator of the Royal Botanic Gardens, Edinburgh.

It is expected that Russian Turkestan will be very well represented at the anthropological exhibition which will be opened next summer at Moscow. We may already mention a very interesting collection of some dozens of skulls, found at Samarkand and belonging to a very remote epoch. A collection of dresses and implements of the inhabitants of the Zarafshan valley will be accompanied by a collection of ethnographic photographs; and among the inhabitants of this valley, the photographs and the skulls from the Galchi tribe will probably draw the special attention of the scientific world. This tribe, which lives in the clefts of the Hindu-Kush at the sources of Zarafshan river, differs from all other Central Asian tribes, and is said to be the remnant of the army of Alexander the Great; indeed, its features are like those of the Greeks; but the tribe remains almost quite unexplored, because of their wildness and the insecurity of travel in those regions. Altogether, the Zarafshan district sends to the exhibition plenty of very valuable anthropological and ethnographical materials.

THE unveiling of the Humboldt monument in Tower Grave Park, St. Louis, U.S., took place on December 24 last. The monument, as our readers will remember, is cast in bronze and executed after the design of the eminent German sculptor, Herr Ferdinand von Miller.

THE Berlin Humboldt Academy, founded by the Scientific Central Union of that city, was inaugurated on January 13 last.

THE competitive examination held at the Paris Conservatoire des Arts et Métiers for the appointment of a Professor of Physics and Meteorology to the National School of Agriculture is said to have been very brilliant. It has ended by the appointment of M. Duclaux, Professor to the Faculty of Lyons, who was trained by M. Pasteur.

THE *Times* Paris Correspondent telegraphs on January 24 that the eruption of mud at the foot of Mount Etna was still going on, but with varying intensity. For two days after the earthquake of the 24th ult. it was considerably stimulated, but it has since slackened, and the mud is more watery. An area of 7,000 square metres is already covered.

A CORRESPONDENT of the *Colonies and India*, writing from Wellington, New Zealand, on December 7, says that a most important discovery of graphite has just been made in the back portion of the province. The Colonial laboratory has received specimens from boulders found in a creek, and these prove to be the purest and most compact samples yet discovered in the Colonies. The value of the discovery is enhanced by the fact that the existence of coal in immediate proximity is thus indicated. In another spot, between Westport and Keffton, an extensive limestone cave has been discovered, and it is stated that it is traversed by a creek yielding good payable gold. The Geological Survey is being steadily pushed on, and Dr. Hector is now attempting to work his way to Waikato, in order to gather information as to the geology of that hitherto unexplored region.

MESSRS. LECHERTIER, BARBE, AND CO., of Regent Street, have sent us a wonderful shilling moist colour-box, which, in utility and the quality of the colours, surpasses anything we have seen.

It is of japanned tin, can be put in the pocket, has every convenience for immediate use, and is altogether excellent and astonishingly cheap. It is a pity that students of science generally don't know how to use colours to give clearness to their note-books and diagrams.

MR. BRYCE WRIGHT has just issued a catalogue of his extensive mineralogical, geological, conchological, and archæological specimens and collections, with several well-executed illustrations. Those interested in the subjects mentioned would do well to obtain a copy of the Catalogue.

MR. GOWER, an American, who has lectured in America with Mr. Bell on the telephone, has realised an interesting improvement on Bell's instrument. The new telephone differs mainly in the form of the magnet, which has been calculated so precisely that the sounds can be heard at any distance from the speaker in a large room. The telephonic current is so powerful that the contact of a magnet can be worked by it, and a signal given in a central telephonic office.

HERR PETZOLD, of Vienna, sends us several specimens of insects preserved apparently in Canada balsam and mounted on microscopic slides, which surpass in several respects anything of the kind we have seen. Herr Petzold informs us that for years he has been working to devise some means of preserving insects and other small animals in such a way as to prevent their being injured by accident or by any of the numerous enemies of museum collections. By a process of mummification, and inclosure in a transparent material he seems to us to have succeeded. The specimens sent can be clearly seen, are natural and life-like in appearance, and completely protected from all atmospheric influences.

THE fall of sleet which occurred in Central France on January 23 was so terrific that an immense number of large branches were broken by the weight of icicles adhering to the leaves. Almost all telegraphic communication between Paris and Central or Southern France was interrupted by the breaking of the telegraphic wires. The messages from Paris to Marseilles were sent *via* London, Lisbon, and Malta. This state of things, which had been anticipated by *Électricité*, raised a number of angry remarks from the principal papers. It is very likely that the German system of entombing the wires of the large lines will be resorted to, and special credits asked from the Chamber of Deputies next session.

THE Postal Microscopical Society is not, as its name would seem to imply, a Microscopical Society for Post Office officials. It embraces a much wider constituency, being commensurate (potentially) with the area of the kingdom embraced by our postal service. It is, in short, an association for the distribution by post of microscopical slides among its members, with facilities for these members making remarks on the slides they receive. From the Report of the fifth annual meeting we see the Society has many members over England, that the organisation is excellent, and works well. Several improvements are contemplated in the sphere of this Society. In consequence of a number of medical men having recently joined the Society, it has been arranged to circulate a special series of histological and pathological slides. These special slides will circulate almost exclusively amongst the medical members, in addition to the usual fortnightly box of slides which goes the whole circuit of the Society, whether members are medical or otherwise. It is also proposed at the request of many members, to circulate a series of slides devoted to botanical subjects; these, after going the round of the contributors, it is proposed should go the whole circuit of the members. Those desiring to join the Society should apply to Mr Alfred Allen, 1, Cambridge Place, Bath.

AN occasional correspondent of the *Daily Press* of Hongkong, gives a somewhat melancholy account of the condition of affairs in Formosa, where it was hoped that the Chinese were showing signs of progress. The Woosung Railway plant, he says, continues to generate rust, the dredger so urgently needed has not been ordered, and the scheme for introducing Swatow coolie emigrants has fallen through. The accounts of the Kelung Colliery are not hopeful, sickness having prostrated European and native miners alike; in the petroleum region, too, all the members of the exploring party are reported to be laid up with fever. What is worse, however, in that quarter, is, the boring rod has snapped low down, and the American experts are said to have spent three weeks in a vain endeavour to connect it again. The only favourable item of news is that there is every prospect of a large sugar-crop in the south of the island.

A CONTEMPORARY in China states that petroleum is obtainable at several places in both North and South Formosa. Some time back a large spring was discovered in the hills to the south-east of the Port of Owlan, in about 24° 30' N. lat. and 121° E. long. The principal spring is situated close to the Owlan River, at the foot of a hill. At certain times of the year the river overflows into this spring, and the oil is carried away down the stream. When the discovery of this well was made, the oil could be tasted in the water some distance off. On exploring the hills behind the spring, large fire-holes were found, and a small spring was met with on the top of a high hill. The lofty ranges of hills to the east of the petroleum valley have been explored to some extent, and in almost every range were found evidences of the existence of coal, but none of the veins or seams are being worked.

WE have received the first two numbers of the Italian *La Natura*, a weekly scientific journal, which we understand is the new form of *L'Elettricità*, founded some time since. *La Natura* is mainly devoted to the physical sciences, and, judging from the first two numbers, is likely to take a creditable place among its scientific contemporaries. In the first number Prof. Schiaparelli writes on the Perturbations communicated by Jupiter to Brofsen's comet in 1872, and in the second number on Recent Researches on the Topography and Physical Constitution of the Moon. There are several other good papers relating both to Italian and to foreign science.

Revue d'Hygiène et de Police Sanitaire is the title of a new sanitary monthly edited by Prof. E. Vallin and published by Masson of Paris.

THE *Annuaire* of the Bureau des Longitudes for 1879 contains as usual a great mass of useful and well-digested information. It contains an interesting paper by Dr. Janssen on Recent Advances in Solar Physics.

WE are glad to learn from the *Royal Gazette* of British Guiana that a Bird Ordinance has been promulgated in that colony, which is likely to prevent the stamping out of birds whose feathers are so eagerly sought after by ladies to add to their charms.

WE have received the first number of the *Revue Mycologique*, a three-weekly journal devoted to the subject of fungi, and edited by M. C. Roumeguère. The Paris publishers are Baillière and Sons.

IN the course of a recent excavation for a railway from Persan to Neuilly-en-Thelle, in the north of France, a field has been cut, which contains numerous sepulchres, and was probably used as a cemetery at some early period. Nearly all the tombs (M. Millet tells us, in *La Nature*) are of hard stone and composed of two pieces (exceptionally three), with transverse joints, and the cover generally a single piece. One tomb is made of plaster.

Various objects have been met with, arms and armour, vases, ceramics, &c., and in one tomb, it is said, a warrior has been discovered fully equipped, and in such preservation that the beard was intact. M. Millet recalls the fact that in the invasion of Gaul by Julius Cæsar, there was a camp of great importance on the plateau above Gouvieux, some ten kilom. from the place of excavation, and on the route from Chantilly to Persan; the place is still known as Cæsar's Camp. Numerous battles took place in the valley of the Oise, as is attested by the medals, coins, &c., often found by farmers in that region. One of these combats was so murderous that the place where it was probably fought bears the name of *Pres de tuerie*; it is at the foot of Beaumont-sur-Oise. The excavations referred to are still in progress, and will doubtless be watched with interest.

THE annual general meeting of the Manchester Field Naturalists' and Archæologists' Society was held on the 21st inst., Mr. John Angell, F.C.S., vice-president, in the chair. Mr. Alfred Griffiths, secretary, read the report for the past year, which stated that 1878 had been devoted to the aims of the Society, with an average success. Mr. Angell gave an address on the science of 1878, in which he reviewed, in an intelligent and appreciative manner, some of the main scientific points of interest during the past year.

THE Geological "Landesanstalt" and Mining Academy at Berlin has recently been considerably enlarged. The institution has moved into new buildings which have just been completed, and which contain a rich collection of maps, minerals, rocks, fossils, &c., besides a large library and laboratories for geological, analytical, metallurgical, and technological work.

THE existence of a subterranean oak forest in the neighbourhood of Rotenburg, Prussia, was proved last summer by the State geologist of that district, Dr. Moesta, of Marburg. The investigations of this gentleman have shown that in the plain of the Fulda valley an oak forest lies buried at a depth of some two or three metres, the origin of which dates back to the tertiary period perhaps, and of which the river Fulda has laid bare many traces by erosion. The wood of the oak trees thus brought to light has by the long action of the water been stained quite black, but still retains considerable firmness. The size of the trees is very considerable, and it remains yet to be proved whether they belong to the same family as the oaks now existing.

A GERMAN paper states that a descendant of the great Copernicus is living now at a small town of Posen, exercising the calling of shoemaker. It is known that Copernicus was a canon of the chapter of Frauenburg, and must be supposed to have died without leaving any issue. It has been said that his true son was Kepler, and that in his turn Kepler was the scientific father of Newton.

THE additions to the Zoological Society's Gardens during the past week include an Entellus Monkey (*Semnopithecus entellus*) from India, presented by Mr. J. Mills, R.H.A.; two Prairie Marmots (*Cynomys ludovicianus*) from North America, presented by Miss Agneta B. Dykes; four Common Gulls (*Larus canis*), a Common Widgeon (*Marca penelope*), four Grey Plovers (*Squatarola helvetica*), three Knots (*Tringa canutus*), a Dunlin (*Tringa cinclus*), European, presented by Mr. F. Cresswell; a Blue and Yellow Macaw (*Ara ararauna*) from South America, presented by F. G. J. Lillingston, Lieut. R.N.; two Coypu Rats (*Myopotamus coypu*), a Brown Coati (*Nasua nasica*), a Chilean Sea Eagle (*Geranoaëtus melanoleucus*), a Dinka Finch (*Dinka grisea*), two Saira Tanagers (*Pyrrhura saira*), two Dark Green Maize Eaters (*Pseudoleistes virescens*), two Blue-bearded Jays (*Cyanocorax cyanopogon*) from Buenos Ayres, two Garden's Night Herons (*Nycticorax gardeni*), an Ariel Toucan (*Ram-*

phastos ariel), a White-bellied Thrush (*Turdus albiventer*) from Bahia, a Great Frigate Bird (*Fregata aquila*) from Pernambuco, a Brazilian Blue Grosbeak (*Guiraca cyanea*) from Mexico, purchased; two Cuming's Octodons (*Octodon cumingi*) from Chili, deposited.

EARLY EXPERIMENTS ON THE CONDUCTION OF ELECTRICITY BY SUBMARINE WIRES FOR ILLUMINATING DISTANT PLACES AND PROPOSALS FOR THE DIVISION OF THE LIGHT INTO SEPARATE LIGHTS

I DO not profess to be acquainted with the means which have been recently employed for conveying electricity to illuminate places at a distance or for sub-dividing the electric light, nor is it with the slightest wish to derogate from the merit of recent inventors that I now submit a few facts as to earlier labours in the same field which may perhaps be interesting to the readers of NATURE.

So far as I know, the first suggestion of communicating electricity for lighting purposes to distant places was in the fourth volume of the *Trans. Roy. Scott. Soc. of Arts*, vol. iv., 1854. In describing the apparent light on a sunken reef in the sea at the entrance of Stornoway Loch, which was lighted in 1851, I stated that "it occurred to me that in some cases gas-pipes might be laid or even submarine wires, so as to illuminate a lantern placed on a beacon or buoy." I did not, however, consider it safe, "at least in the present state of our knowledge," to adopt either of these plans; but gave the preference to an apparent light illuminated by a beam of rays projected from a lens placed on the shore at a distance of 530 feet from the sunken rock, which plan has been in use since 1851.

In 1852, and therefore not long after the erection of the Stornoway light, Admiral Sheringham used electricity for producing heat for the purpose of igniting gas at a buoy.

My friend, Mr. Alan Brebner, C.E., suggested, as referred to in Messrs. Stevenson's Report on the electric light in 1865, that the lighthouses of Scotland might be illuminated from one great central station.

In 1865 I made experiments for the Commissioners of Northern Lighthouses with the sanction of the Board of Trade, on lighting beacons by submarine wires, and on the suggestion of my friend, Prof. Swan, increased the flashes by combining a Leyden jar with an induction coil. On January 13, 1866, I communicated to the Secretary of the Roy. Scott. Society of Arts that the induction spark placed in the focus of lighthouse apparatus gave in all respects satisfactory results at the distance of half a mile, which, owing to intervening objects, was the greatest distance from which it could be seen. The primary current was also kept for a week passing continuously night and day, through 800 feet of wire without any sensible waste of the platinum electrodes. I next attempted to pass the current through a cable under the sea, but without success, when Messrs. Stevenson applied to Dr. Siemens for his assistance in the matter, and he recommended an electro-magnet on the beacon with a contact lever actuated by the armature of the electro-magnet in the manner of a Neff's hammer. The luminous effect was increased by the deflagration of mercury. This plan, as tried at Granton Harbour, was quite successful; but the products of combustion were deposited on the optical apparatus, and some mechanical difficulties interfered with its continuous working.

Being thus thrown back on the old plan of the induction spark, I was enabled to overcome the difficulties by the following expedients:—Mr. Brebner suggested placing the induction coils with condensers close to the optical apparatus on the beacon and the battery and contact breaker on the shore, so as to pass only the primary current through the cable. Mr. Hart, electrician, also designed an improved break for the purpose, and Prof. Tait recommended the enlargement of the earth terminals. By these arrangements the current was passed successfully under the sea. The experiment was repeated at Granton, at the request of the Trinity House of London, in presence of Captains Fenwick and Nisbet, and Mr. Douglass, the engineer, accompanied by Mr. Farrer and Mr. Shaw Lefevre of the Board of Trade.¹ The distance between the battery and break on Granton Pier and the induction coils and optical apparatus on Newhaven Pier is

¹ "Proposals for the Illumination of Beacons and Buoys," by T. Stevenson, p. 14. (Edinburgh: A. and C. Black, 1870.)